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L2: Entry 1 of 1

File: PGPB

Jan 23, 2003

DOCUMENT-IDENTIFIER: US 20030016014 A1

TITLE: Generation of synthetic nuclear magnetic resonance signals

Abstract Paragraph:

The invention involves an active phantom that transmits a waveform based on data reflecting free induction decay signals. The methods and apparatuses of the invention can be used, for example, to test and calibrate a magnetic resonance scanner; evaluate image acquisition parameters and reconstruction algorithms; and train scanner operators. In addition, the invention can simulate complex samples, e.g., a human brain without requiring human subject available to submit to the time and discomfort of a magnetic resonance scan.

Pre-Grant Publication (PGPub) Document Number:20030016014Summary of Invention Paragraph:

[0009] The convenience offered by the apparatus facilitates activities including testing of the scanner and training of researchers and clinicians. Since the apparatus can simulate FID signals of, e.g., a human brain, it obviates the need to subject persons to uncomfortable and time-consuming MR scans solely for machine or software testing and development purposes. Similarly, the invention eliminates the need for human or animal subjects to train clinical radiologists and researchers, since it generates synthetic FID signals that can simulate the signals that these subjects would emit.

Summary of Invention Paragraph:

[0010] Embodiments of this aspect of the invention include one or more of the following features. The waveform generator can have a modulated frequency source, which is a base-band or intermediate frequency generator and a modulator, or a digital synthesizer. This modulated frequency source can also include an amplifier. A control device, e.g., a computer can also be included in the waveform generator. This computer can be included as part of an MR scanner or a separate computer with an appropriate hardware interface, such as an I/O card. Alternatively, the control device can be custom-designed digital or analog hardware. A keyboard can be used to program the waveform generator manually. As a result, the apparatus can be programmed on the fly to simulate the free induction signals desired at any particular time, or to analyze hypothetical patterns for, e.g., training and software development purposes.

Summary of Invention Paragraph:

[0013] This version of the invention offers several benefits. By storing different datasets for FID signals on the storage medium, a user can employ the apparatus for diverse purposes. For example, the apparatus can simulate the MR RF signals for healthy and diseased human brains. The stored data can also include signals based on different scan parameters or can be in a form where the apparatus can generate waveforms based on various scan parameters received from another source. Thus, a clinician can be trained to recognize the differences between healthy and diseased tissue as they appear in different types of scans. This training can also be used

simulate  
6025-717

to demonstrate that certain scan parameters provide better resolution of certain conditions and to teach clinicians how to recognize whether an additional scan could provide better a better basis for diagnosis.

Summary of Invention Paragraph:

[0014] In addition, testing and calibration protocols can be used to facilitate scanner maintenance and determine coil sensitivity. Data reflecting specific problems can be stored to train operators to recognize problems caused by, e.g., mechanical failures or patient movement, without disrupting the scanner or subjecting a patient to the discomfort of an MR scan. Thus, this apparatus can be a valuable "simulator," enabling users to gain more experience in a shorter period of time.

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☐ 3. Document ID: US 6549009 B1

L6: Entry 3 of 4

File: DWPI

Apr 15, 2003

DERWENT-ACC-NO: 2003-539749

DERWENT-WEEK: 200351

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TITLE: Magnetic resonance imaging device for diagnosing abnormalities in biological tissue, provides processed digital data of previously photographed object, to all units to determine proper operation of units

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Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 4. Document ID: US 6025717 A

L6: Entry 4 of 4

File: DWPI

Feb 15, 2000

DERWENT-ACC-NO: 2000-204887

DERWENT-WEEK: 200351

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TITLE: Simulator for magnetic resonance imager has number of stages allowing data input to each major stage of imager in turn

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Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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Term	Documents
HERTZ	36067
HERTZES	26
(5 AND (HERTZ.IN.)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	4
(L5 AND (HERTZ.IN.)).PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD.	4

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☐ 1. Document ID: US 6549009 B1

Using default format because multiple data bases are involved.

L6: Entry 1 of 4

File: USPT

Apr 15, 2003

US-PAT-NO: 6549009

DOCUMENT-IDENTIFIER: US 6549009 B1

TITLE: Diagnostic simulator for MRI

DATE-ISSUED: April 15, 2003

#### INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
<u>Hertz</u> ; David	Dix Hills	NY		
<u>Knepper</u> ; Michael B.	Lindenhurst	NY		

US-CL-CURRENT: 324/309; 324/307, 324/322

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Dc
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☐ 2. Document ID: US 6025717 A

L6: Entry 2 of 4

File: USPT

Feb 15, 2000

US-PAT-NO: 6025717

DOCUMENT-IDENTIFIER: US 6025717 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Diagnostic simulator for MRI

DATE-ISSUED: February 15, 2000

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<u>Hertz</u> ; David	Dix Hills	NY		
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US-CL-CURRENT: 324/310; 324/307, 324/309

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Dc
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